



## Complete Summary

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### GUIDELINE TITLE

ACR Appropriateness Criteria™ for hematemesis.

### BIBLIOGRAPHIC SOURCE(S)

American College of Radiology (ACR), Expert Panel on Cardiovascular Imaging. Hematemesis. Reston (VA): American College of Radiology (ACR); 2002. 7 p. (ACR appropriateness criteria). [38 references]

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## SCOPE

### DISEASE/CONDITION(S)

Hematemesis

### GUIDELINE CATEGORY

Diagnosis  
Treatment

### CLINICAL SPECIALTY

Emergency Medicine  
Family Practice  
Gastroenterology  
Internal Medicine  
Radiology

### INTENDED USERS

Health Plans  
Hospitals  
Managed Care Organizations  
Physicians  
Utilization Management

## GUIDELINE OBJECTIVE(S)

To evaluate the appropriateness of initial radiologic examinations for hematemesis

## TARGET POPULATION

Patients with hematemesis

## INTERVENTIONS AND PRACTICES CONSIDERED

### Diagnosis

1. Chest x-ray
2. Abdominal arteriography
3. Ultrasound
  - Hepatic Doppler ultrasound
  - Endoscopic ultrasound
4. Computed tomography (CT)
  - Abdominal CT
  - Chest CT
5. Wedge hepatic venography
6. Technetium 99m (Tc-99m) labeled red blood cell (RBC) scan
7. Magnetic resonance imaging (MRI)/magnetic resonance angiography (MRA)/magnetic resonance venography (MRV)
8. Barium swallow and upper gastrointestinal (GI) series
9. Technetium 99m sulfur colloid scan
10. Splenoportography

### Treatment

#### General

1. Endoscopic hemostatic therapy
  - Injection of sclerosants and/or vasoconstrictors
  - Thermal coagulation techniques
  - Mechanical methods
2. Selective arterial catheterization to deliver local therapy, such as vasopressin infusion, or embolization

#### Bleeding Due to Portal Hypertension

1. Pharmacologic therapy
  - Vasopressin and its analogue terlipressin
  - Somatostatin and its analogue octreotide
  - Nitrovasodilators

2. Balloon tamponade
3. Endoscopic sclerotherapy
4. Endoscopic variceal ligation
5. Percutaneous transcatheter embolization
6. Transjugular intrahepatic portosystemic shunt (TIPS)

Bleeding Due to Hemobilia

Selective hepatic arteriography with therapeutic embolization

## MAJOR OUTCOMES CONSIDERED

Utility of radiologic examinations in differential diagnosis

## METHODOLOGY

### METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

### DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The guideline developer performed literature searches of recent peer-reviewed medical journals, primarily using the National Library of Medicine's MEDLINE database. The developer identified and collected the major applicable articles.

### NUMBER OF SOURCE DOCUMENTS

The total number of source documents identified as the result of the literature search is not known.

### METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Expert Consensus (Delphi Method)  
Weighting According to a Rating Scheme (Scheme Not Given)

### RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Not applicable

### METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses  
Systematic Review with Evidence Tables

### DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

One or two topic leaders within a panel assume the responsibility of developing an evidence table for each clinical condition, based on analysis of the current literature. These tables serve as a basis for developing a narrative specific to each clinical condition.

## METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus (Delphi)

## DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Since data available from existing scientific studies are usually insufficient for meta-analysis, broad-based consensus techniques are needed to reach agreement in the formulation of the Appropriateness Criteria. Serial surveys are conducted by distributing questionnaires to consolidate expert opinions within each panel. These questionnaires are distributed to the participants along with the evidence table and narrative as developed by the topic leader(s). Questionnaires are completed by the participants in their own professional setting without influence of the other members. Voting is conducted using a scoring system from 1-9, indicating the least to the most appropriate imaging examination or therapeutic procedure. The survey results are collected, tabulated in anonymous fashion, and redistributed after each round. A maximum of three rounds is conducted and opinions are unified to the highest degree possible. Eighty (80) percent agreement is considered a consensus. If consensus cannot be reached by this method, the panel is convened and group consensus techniques are utilized. The strengths and weaknesses of each test or procedure are discussed and consensus reached whenever possible.

## RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

## COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

## METHOD OF GUIDELINE VALIDATION

Internal Peer Review

## DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

Criteria developed by the Expert Panels are reviewed by the American College of Radiology (ACR) Committee on Appropriateness Criteria and the Chair of the ACR Board of Chancellors.

## RECOMMENDATIONS

### MAJOR RECOMMENDATIONS

ACR Appropriateness Criteria™

Clinical Condition: Hematemesis

Variant 1: History of alcoholism or liver disease.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Chest x-ray	8	
Abdominal arteriography	6	
Ultrasound		
Hepatic Doppler ultrasound	6	
Endoscopic ultrasound	4	
CT		
Abdominal CT	6	
Chest CT	4	
Wedge hepatic venography	6	
Tc-99m labeled RBC scan	6	
MRI /MRA/MRV	6	MRI may be substituted for CT once the patient is stabilized.
Barium swallow and upper GI series	4	
Tc-99m sulfur colloid scan	4	
Splenoportography	2	
<p style="text-align: center;">Appropriateness Criteria Scale  1 2 3 4 5 6 7 8 9  1=Least appropriate 9=Most appropriate</p>		

Abbreviations: CT, computed tomography; Tc-99m, technetium-99m; RBC, red blood cell; MRI, magnetic resonance imaging; MRA, magnetic resonance angiography; MRV, magnetic resonance venography; GI, gastrointestinal

Variant 2: No history of alcoholism or liver disease.

Radiologic Exam Procedure	Appropriateness Rating	Comments
Abdominal arteriography	8	
Chest X-ray	8	
Tc-99m sulfur colloid scan	6	
Tc-99m labeled RBC Scan	6	
Ultrasound		
Hepatic Doppler ultrasound	4	
Endoscopic ultrasound	2	
CT		
Abdominal CT	4	
Chest CT	4	
Barium swallow and UGI series	4	
MRI /MRA/MRV	4	MRI may be substituted for CT once the patient is stabilized.
Wedge hepatic venography	4	
Splenoportography	2	
<p>Appropriateness Criteria Scale  1 2 3 4 5 6 7 8 9  1=Least appropriate 9=Most appropriate</p>		

Abbreviations: Tc-99m, technetium-99m; RBC, red blood cell; CT, computed tomography; UGI, upper gastrointestinal; MRI, magnetic resonance imaging; MRA, magnetic resonance angiography; MRV, magnetic resonance venography

In patients with GI bleeding, stabilization of blood pressure and restoration of intravascular volume is the first priority. Only then should an attempt be made to

identify and arrest the cause of bleeding. A temporary nasogastric tube should be inserted to aspirate gastric contents. The color of the gastric aspirate has prognostic significance and patients with red blood per gastric aspirate and red blood per rectum have a 30% mortality. A directed history may suggest the source of the bleeding. In 70% to 80% of patients with upper gastrointestinal (UGI) bleeding, bleeding stops spontaneously. Peptic ulcer disease is the leading cause of UGI bleeding in most series. However, series consisting of inner-city populations show a greater proportion of erosive gastritis and varices.

The three most important diagnostic techniques in the investigation of UGI bleeding are endoscopy, angiography, and radionuclide studies. Endoscopy (esophagogastroduodenoscopy) should be used as the initial method to define and treat acutely bleeding lesions. Patients with UGI bleeding that is ongoing or of sufficient magnitude to produce changes in vital signs or require transfusion should undergo emergent endoscopy. Emergency endoscopy identifies the source of hemorrhage in about 95% of cases. The endoscopic diagnosis provides important prognostic information regarding the risk of rebleeding and mortality. The endoscopic appearance of an ulcer provides prognostic information regarding rebleeding, the need for surgery, the level of hospital care required, and mortality. With rapid bleeding, however, it may not be possible to adequately visualize the site of bleeding, and with small bowel bleeding, upper or lower endoscopy is not always helpful.

Endoscopic hemostatic therapy can be grouped into three categories: 1) injection of sclerosants and/or vasoconstrictors, 2) use of thermal coagulation techniques, and 3) mechanical methods.

With bleeding ulcers, thermal devices can stop bleeding 90% of the time. Multipolar electrocoagulation, laser photocoagulation, and heater probe therapy control bleeding equally well; however, the laser probe is used less frequently because of its higher cost. A meta-analysis of trials of therapeutic endoscopy showed that all modalities (laser photocoagulation, multipolar coagulation, heater probe, and injection therapy) are effective in reducing risk of rebleeding and the need for emergency surgery.

With acute hemorrhagic gastritis, endoscopic therapy may be more difficult because of the potential for diffuse mucosal bleeding.

Barium studies have no role in the evaluation of acute UGI bleeding. Technically adequate studies may be difficult to obtain in critically ill patients. Barium in the GI tract obscures active extravasation and may interfere with subsequent endoscopy or angiography. In stabilized patients with chronic, slow, or intermittent bleeding, barium studies may have a role in identifying lesions as potential sources of bleeding. Because endoscopy is more accurate than barium studies, it should always precede barium studies in the evaluation of chronic UGI bleeding.

Radionuclide scans are also used in the diagnosis of gastrointestinal bleeding. Two categories of radiopharmaceuticals are clinically useful: 1) agents that are rapidly cleared from the vascular space by a specific organ, such as Technetium-99m (Tc-99m) sulfur colloid and 2) agents that circulate for an extended period such as Tc-99m labeled red blood cells (RBC). Because the Tc-99m sulfur colloid is rapidly

cleared from the circulation, the patient must be actively bleeding at the time of injection. Bleeding rates as low as 0.05 mL/min to 0.1 mL/min can be detected using radionuclide techniques. The Tc-99m labeled RBC study is the method most frequently used in the detection of GI bleeding. Imaging may be performed over a 24-hour period, which is important in the evaluation of intermittent bleeding. The need for delayed imaging to identify a bleeding site introduces uncertainty with respect to location because antegrade and retrograde movement of intraluminal red cells can occur.

Most early series reported sensitivities greater than 90% for the detection of bleeding with radionuclide scans, higher than those of arteriography. However, several recent studies have shown errors in localization of the bleeding site in up to 60% of cases. When the value of the scan in predicting a subsequent positive arteriogram was examined, patients had a nearly equal likelihood of having a positive or negative arteriogram regardless of the result of the Tc-99m RBC scan. In a study of 103 patients, of 85 patients with a bleeding site documented by arteriography, surgery, or endoscopy, only 15% of patients had a positive Tc-99m RBC scan that correctly localized the bleeding, and the overall sensitivity of the radionuclide study for bleeding was only 20%. From this experience, some have questioned the value of the radionuclide test as a screening procedure prior to arteriography. However, these series included a substantial proportion of patients in whom endoscopy would be expected to identify the bleeding site. The successful use of endoscopy initially should leave only a small percentage of patients with UGI bleeding in whom nuclear medicine studies may be of value. The radionuclide techniques may be of more value in the diagnosis of lower GI bleeding. Accuracy may be enhanced when cine images are used to follow peristaltic movement.

When acute GI bleeding is intermittent, and endoscopy does not identify the lesion, angiography is often requested. If the patient is not actively bleeding, angiography will have a low yield. Consequently, in practice, the vascular radiologist may defer angiography until a radionuclide study has been performed. If there is evidence of bleeding on the radionuclide study, this affords the angiographer some confidence that the study will have a chance of detecting the offending vessel. It further assists in the timing of angiography. If there is no active bleeding, angiography does not have to be performed on an emergency basis. Arteriography may still be indicated as it may reveal a structural lesion that bleeds intermittently. For diagnosis of Meckel's diverticulum, scintigraphy with pertechnetate continues to be the most efficient technique.

Arteriography is used in the diagnosis of both acute and chronic bleeding and in the treatment of GI bleeding. It is indicated when endoscopy is negative or unsuccessful in controlling bleeding. The accuracy of diagnostic arteriography for detecting a bleeding source is increased if there is active bleeding. Mesenteric arteriography has sensitivity for identifying active hemorrhage at a minimal rate of 0.5 mL/min. Only arterial or capillary bleeding can be detected by selective visceral arteriography; venous bleeding is rarely, if ever, detected on the venous phase of an arteriogram. With variceal hemorrhage, varices can be demonstrated, but the role of angiography in this setting is primarily to rule out a concomitant source of arterial bleeding and to define vascular anatomy.



Arteriography is also indicated in patients with chronic intermittent bleeding of obscure origin in whom all other modalities are unrevealing. In one study, the source of bleeding was established by arteriography in 44% of such patients. Repeat arteriography in patients with continued bleeding following an initially negative angiogram has been shown to be diagnostic in 25% of cases. Subselective catheterization of the bleeding vessel at time of arteriography with injection of methylene blue can facilitate intraoperative identification of the bleeding bowel segment.

Selective arterial catheterization can be used to deliver local therapy such as vasopressin infusion or embolization. In patients with gastric mucosal bleeding, selective vasopressin infusion is associated with an overall bleeding control rate of 72% and a bleeding recurrence rate of 18%. Vasopressin is less effective in controlling pyloroduodenal, hepatic, or pancreatic bed bleeding with control rates of 31% to 42% and rebleeding rates of 25% to 33%. This is attributed, among other factors, to the dual vascular supply in the duodenum. Small-bowel hemorrhage has been reported to be controlled with intraarterial vasopressin in 71% of patients.

Transcatheter arterial embolization therapy is widely used to control UGI bleeding from arterial sources. It has been associated with lower complication rates than have been reported with vasopressin.

Vascular embolization can be used for virtually all arterial or arteriocapillary bleeding sources in the UGI tract. In patients with prior surgery, assessment of collateral supply should be made. Success in controlling duodenal hemorrhage by embolotherapy ranges from 60% to 100%. Transcatheter embolization therapy is also of benefit in patients with mesenteric bleeding. As mesenteric embolization carries a risk of bowel infarction, careful evaluation of the vascular supply in the affected region should be made. To avoid bowel injury, it has been recommended that only one of the segmental branches of the nearest arcade of the vasa recta should be embolized, and embolization of the vasa recta should be avoided. A variety of embolic agents are used. Microcoils, alone or in combination with gelatin sponge particles or polyvinyl alcohol sponge particles or hydrogel spheres are effective embolic agents. Absolute alcohol or gelfoam powder are not recommended due to distal penetration of these agents.

### Bleeding Due to Portal Hypertension

Esophageal varices form only when the hepatic vein pressure gradient exceeds 12 mm Hg and variceal hemorrhage typically does not occur until the hepatic vein pressure gradient exceeds 12 mm Hg. Endoscopy is indicated to determine the site and activity of bleeding. One third to one half of bleeding cirrhotics are not bleeding from varices. Endoscopic therapy is currently the treatment of choice for active variceal hemorrhage. Pharmacologic therapy to reduce portal pressure is a first-line therapy that can be administered emergently while awaiting endoscopy. Balloon tamponade is useful when pharmacologic and endoscopic treatment fail to produce stabilization prior to radiologic intervention or surgery. A variety of pharmacologic agents are available. These include vasopressin and its analogue terlipressin, somatostatin and its analogue octreotide, and nitrovasodilators. Vasopressin infusion has been reported to achieve hemostasis in 70% to 85% of patients, but approximately 30% to 50% of patients experienced early rebleeding.

Somatostatin is more effective than placebo or vasopressin and has fewer side effects than vasopressin. It is supplanting vasopressin as the treatment of choice in active variceal hemorrhage. Octreotide, a synthetic analogue of somatostatin with a longer half-life, has become the most widely used pharmacologic therapy for acute variceal hemorrhage. It is the drug of choice in the United States because of its ready availability as compared with somatostatin. Terlipressin, which has fewer side effects than vasopressin and nitroglycerin combined, is comparable to somatostatin and octreotide, but is not available in the United States.

Balloon tamponade has been shown to be initially effective in 84% to 92% of patients; however, rebleeding is common after deflation or removal, occurring in 27% to 45% of patients. Endoscopic treatment is currently the treatment of choice for active variceal hemorrhage. Multiple randomized trials with subsequent meta-analysis have shown endoscopic sclerotherapy (EST) to be either superior to, or at least as effective as, pharmacologic therapy alone or in combination with balloon tamponade in the control of active hemorrhage. A meta-analysis of seven long-term studies suggested that EST when compared with medical therapy reduced mortality by 25%. Endoscopic sclerotherapy may be unsuccessful in 10% to 30% of patients, with recurrent bleeding occurring in as many as 30% to 50% of patients. Another concern is the high incidence of complications postsclerotherapy, which include bleeding, perforation, and stenosis with an associated 15% mortality rate. This stimulated the introduction of endoscopic variceal ligation (EVL), which has been found to be equally effective in controlling acute bleeding and is associated with fewer complications than EST.

The portal venous system can be evaluated using a variety of imaging techniques. Arterial portography, direct transhepatic portal venography, transjugular portal venography, and splenoportography all permit evaluation of portal venous flow patterns, which may aid preoperative shunt planning, detection of varices, and postoperative assessment of shunt patency. Splenoportography is infrequently used. Wedged hepatic venography is a useful index of portal venous pressure. Newer, noninvasive imaging modalities, including color duplex Doppler ultrasound, computed tomography (CT) and magnetic resonance imaging (MRI), also allow evaluation of the portal venous system and assessment of shunt patency as well as the liver parenchyma. They frequently replace the invasive procedures.

Percutaneous transcatheter embolization of the coronary vein and esophageal varices has been shown to control variceal bleeding in 83% of patients; however, bleeding recurs in 55% of surviving patients at 6 months and in 66% at one year. Because recurrent bleeding is a common problem, this technique is no longer widely used.

Approximately 10% to 20% of patients fail to stop bleeding or rebleed following endoscopic treatment. A second attempt at endoscopic therapy may be successful; however, if it is unsuccessful, alternative therapy is recommended, since when two attempts at hemostasis fail, the risk of mortality is high. Surgical shunt procedures are effective in stopping initial bleeding and preventing rebleeding; however, emergency surgery is associated with an approximately 50% mortality in poor operative candidates. The lack of available donor organs precludes the emergency use of liver transplantation for patients with end-stage liver disease who develop acute variceal hemorrhage.

The TIPS (transjugular intrahepatic portosystemic shunt) procedure has been shown to effectively stop variceal bleeding unresponsive to endoscopic therapy. Numerous studies have shown it to be of benefit in the management of patients with esophageal varices who have failed pharmacologic and endoscopic therapy and who are poor surgical candidates. The incidence of rebleeding increases to approximately 24% to 30% after two-year follow-up because of stent stenosis primarily due to neointimal hyperplasia. Shunt patency can usually be restored with angioplasty or additional stents. Therefore, TIPS patency should be monitored with periodic Doppler ultrasound or venography.

### Bleeding Due to Hemobilia

Hemobilia has been observed with increasing frequency because of the greater use of percutaneous transhepatic procedures. Upper endoscopy may demonstrate blood from the ampulla, but this does not specify the site or cause of the hemorrhage. Surgical ligation of the main hepatic artery or partial hepatectomy were previously the treatment of choice, but have been replaced by selective hepatic arteriography with therapeutic embolization in those cases due to hepatic artery bleeding. With biliary venous fistulae associated with percutaneous transhepatic tubes, tube replacement with embolization of the tube tract is useful.

### CLINICAL ALGORITHM(S)

Algorithms were not developed from criteria guidelines.

## EVIDENCE SUPPORTING THE RECOMMENDATIONS

### TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The recommendations are based on analysis of the current literature and expert panel consensus.

## BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

### POTENTIAL BENEFITS

#### Overall Benefits

- Selection of appropriate radiologic imaging procedures for hematemesis
- Appropriate therapeutic interventions for patients with upper gastrointestinal bleeding (UGI), including bleeding due to portal hypertension and bleeding due to hemobilia

#### Specific Diagnostic Benefits

- The endoscopic appearance of an ulcer provides prognostic information regarding the risk of rebleeding, the need for surgery, the level of hospital care required, and mortality.
- Bleeding rates as low as 0.05 mL/min to 0.1 mL/min can be detected using radionuclide techniques.

## Specific Treatment Benefits

- A meta-analysis of trials of therapeutic endoscopy showed that all modalities (laser photocoagulation, multipolar coagulation, heater probe, and injection therapy) are effective in reducing the risk of rebleeding and the need for emergency surgery.
- Transcatheter arterial embolization therapy has been associated with lower complication rates than have been reported with vasopressin.
- A meta-analysis of seven long-term studies suggested that endoscopic sclerotherapy (EST) when compared to medical therapy reduced mortality by 25%. Endoscopic variceal ligation (EVL) has been found to be equally effective as endoscopic sclerotherapy in controlling bleeding, but with fewer complications.
- The TIPS (transjugular intrahepatic portosystemic shunt) procedure has been shown to effectively stop variceal bleeding unresponsive to endoscopic therapy.

## Subgroups Most Likely to Benefit:

- Patients with upper gastrointestinal bleeding (UGI) that is ongoing or of sufficient magnitude to produce changes in vital signs or require transfusion.
- Arteriography is indicated in patients with chronic intermittent bleeding of obscure origin in whom all other modalities are unrevealing.
- Numerous studies have shown the transjugular intrahepatic portosystemic shunt (TIPS) procedure to be of benefit in the management of patients with esophageal varices who have failed pharmacologic and endoscopic therapy and who are poor surgical candidates.

## POTENTIAL HARMS

- With acute hemorrhagic gastritis, endoscopic therapy may be more difficult because of the potential for diffuse mucosal bleeding.
- As mesenteric embolization carries a risk of bowel infarction, careful evaluation of the vascular supply in the affected region should be made.
- Balloon tamponade has been shown to be initially effective in 84% to 92% of patients; however, rebleeding is common after deflation or removal, occurring in 27% to 45% of patients. Endoscopic sclerotherapy may be unsuccessful in 10% to 30% of patients, with recurrent bleeding in as many as 30% to 50% of patients.
- Percutaneous transcatheter embolization of the coronary vein and esophageal varices has been shown to control variceal bleeding in 83% of patients; however, bleeding recurs in 55% of surviving patients at 6 months and in 66% at one year. Because recurrent bleeding is a common problem, this technique is no longer widely employed.
- Surgical shunt procedures are effective in stopping initial bleeding and preventing rebleeding; however, emergency surgery is associated with an approximately 50% mortality in poor operative candidates. The lack of available donor organs precludes the emergency use of liver transplantation for patients with end-stage liver disease who develop acute variceal hemorrhage.
- Using the transjugular intrahepatic portosystemic shunt (TIPS) procedure, the incidence of rebleeding increases to approximately 24% to 30% after two-

year follow-up because of stent stenosis primarily due to neointimal hyperplasia.

## QUALIFYING STATEMENTS

### QUALIFYING STATEMENTS

An American College of Radiology (ACR) Committee on Appropriateness Criteria and its expert panels have developed criteria for determining appropriate imaging examinations for diagnosis and treatment of specified medical condition(s). These criteria are intended to guide radiologists, radiation oncologists, and referring physicians in making decisions regarding radiologic imaging and treatment. Generally, the complexity and severity of a patient's clinical condition should dictate the selection of appropriate imaging procedures or treatments. Only those exams generally used for evaluation of the patient's condition are ranked. Other imaging studies necessary to evaluate other co-existent diseases or other medical consequences of this condition are not considered in this document. The availability of equipment or personnel may influence the selection of appropriate imaging procedures or treatments. Imaging techniques classified as investigational by the U.S. Food and Drug Administration (FDA) have not been considered in developing these criteria; however, study of new equipment and applications should be encouraged. The ultimate decision regarding the appropriateness of any specific radiologic examination or treatment must be made by the referring physician and radiologist in light of all the circumstances presented in an individual examination.

## IMPLEMENTATION OF THE GUIDELINE

### DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

## INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

### IOM CARE NEED

Getting Better

### IOM DOMAIN

Effectiveness

## IDENTIFYING INFORMATION AND AVAILABILITY

### BIBLIOGRAPHIC SOURCE(S)

American College of Radiology (ACR), Expert Panel on Cardiovascular Imaging. Hematemesis. Reston (VA): American College of Radiology (ACR); 2002. 7 p. (ACR appropriateness criteria). [38 references]

#### ADAPTATION

Not applicable: The guideline was not adapted from another source.

#### DATE RELEASED

1998 (revised 2002)

#### GUIDELINE DEVELOPER(S)

American College of Radiology - Medical Specialty Society

#### SOURCE(S) OF FUNDING

The American College of Radiology (ACR) provided the funding and the resources for these ACR Appropriateness Criteria™.

#### GUIDELINE COMMITTEE

ACR Appropriateness Criteria™ Committee, Expert Panel on Cardiovascular Imaging

#### COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Panel Members: Antoinette S. Gomes, MD; Michael A. Bettmann, MD; Lawrence M. Buxt, MD; Julius Grollman, MD; Martin J. Lipton, MD; Heriberto Pagan-Marin, MD; Joseph F. Polak, MD, MPH; Neil M. Rofsky, MD; David Sacks, MD; William Stanford, MD; Jack A. Ziffer, MD, PhD; Gregory L. Moneta, MD; Michael Jaff, MD

#### FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Not stated

#### GUIDELINE STATUS

This is the current release of the guideline. It updates a previously published version: Hematemesis. American College of Radiology. ACR Appropriateness Criteria. Radiology 2000 Jun; 215(Suppl): 113-9.

The ACR Appropriateness Criteria™ are reviewed after five years, if not sooner, depending upon introduction of new and highly significant scientific evidence. The anticipated next review date for this topic is 2007.

#### GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the [American College of Radiology \(ACR\) Web site.](#)

Print copies: Available from American College of Radiology, 1891 Preston White Drive, Reston, VA 20191. Telephone: (703) 648-8900.

#### AVAILABILITY OF COMPANION DOCUMENTS

None available

#### PATIENT RESOURCES

None available

#### NGC STATUS

This summary was completed by ECRI on February 20, 2001. The information was verified by the guideline developer on March 14, 2001. This summary was updated by ECRI on March 31, 2003. The updated information was verified by the guideline developer on April 21, 2003.

#### COPYRIGHT STATEMENT

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